

CHURCH STREET MARKETPLACE PEDESTRIAN & STREETScape ASSESSMENT



*Final Report
June 2, 2017*



CHURCH STREET
MARKETPLACE



CHITTENDEN COUNTY RPC
Communities Planning Together

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Project Background

The Church Street Marketplace, Vermont's premier retail tourist attraction, is near completion of a major capital overhaul which began in 2003. With the support of a Transportation Community Systems Preservation grant from the Federal Highway Administration (FHWA) and augmented by additional FHWA support the City of Burlington and the Marketplace have invested over \$7,900,000 in this thirty-year old facility to provide new brick surfacing, preservation improvements to the historic City Hall, re-designed intersections with downtown cross streets and a newly designed and engineered electrical system which provides modern services at the street level and state of the art pedestrian lighting. This assessment includes a general evaluation of the current Marketplace existing conditions identifying areas in need of maintenance, as well as conceptual reconstruction plans for the Church and Bank Streets intersection and the Church and College Streets intersection.

Study Area

The yellow outlined study area in Figure 1 below encompasses the entirety of Church Street Marketplace from Pearl Street to Main Street; including side streets up to the boundaries of Church Street Marketplace buildings. The intersections of Church and Bank Streets, Church and College Streets and the Church Street area in front of City Hall are high priority areas, highlighted in blue, which have been given a more in-depth assessment.

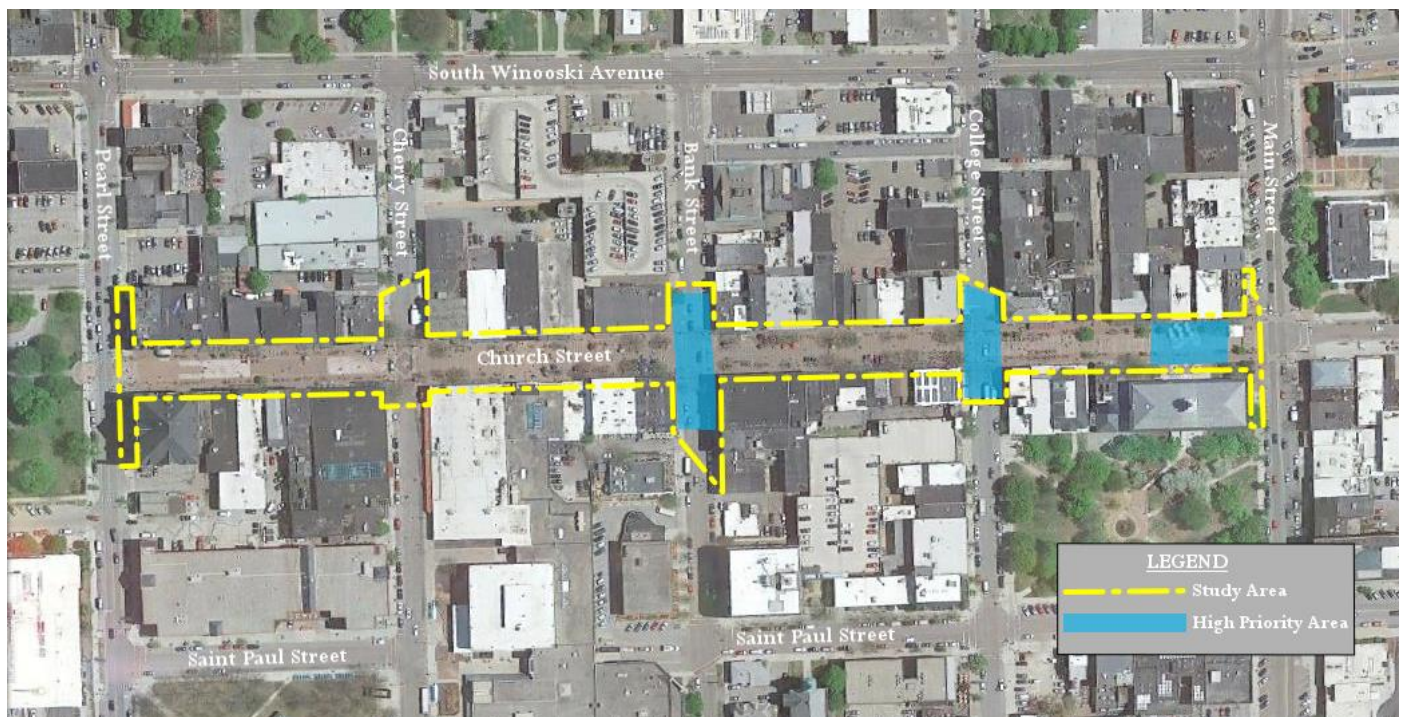


Figure 1: Project Study Area

Visual Site Evaluation

Dubois & King, Inc. performed a visual site evaluation on September 30, 2016 accompanied by Church Street Marketplace Executive Director Ron Redmond and the Marketplace Maintenance Supervisor. Problem locations were collected using a handheld GPS surveying unit, and then categorized based on type of maintenance required and urgency level. Tree pit locations and types were collected as well. This data has been compiled into a digital orthophoto base map (see Appendix A) and corresponding Required Maintenance Table (see Appendix B).

The various required maintenance categories include vaults, utilities, damaged pavers and grading. These have been further classified into urgency categories of big ticket items to be dealt with immediately, incidental repairs, and deferred maintenance which should be incorporated into future nearby projects. Big ticket items are made up of the re-paving of the Church and Bank Streets intersection, Church and College Streets intersection, and the Church Street area in front of Burlington City Hall, as well as remediating subsurface vault issues. Incidental repairs include tree and tree pit removal. Deferred maintenance items are mainly isolated damaged pavers, low spots and potential tripping hazards. The recommendation to defer these items is due to the fact that brick paving repairs typically require a significantly larger area of pavers to be removed to address spot problems, so it makes financial sense to wait until there is another project in the vicinity. None of these items are currently causing serious problems, and not many falls or trips have been reported on Church Street.

Big Ticket Items

High-Priority Areas

High-priority areas exhibiting a significant area of paver damage were given more substantial survey attention. These areas were the intersections of Church and Bank streets, Church and College Streets and the Church Street globe paver area in front of Burlington City Hall. Dubois & King, Inc. completed topographic surveys of these locations on September 16, 2016. Existing Conditions Plans created from these surveys can be found in Appendix C.

Recommended maintenance upgrades for these areas are illustrated in the Proposed Improvement Plans provided in Appendix D. One of the two proposed paver pattern options should be selected for both intersections and become the standard for Marketplace intersection crosswalk paving and tactile ADA warning surface pavers moving forward. The term crosswalk at the Church Street intersections encompasses the full pedestrian corridor width with enhanced crosswalk zones at both of the vehicular approach ends.

Church Street & Bank Street Intersection

As depicted on Sheet 1 of Appendix C, this intersection features granite curb bump-outs, a roughly 80-foot wide brick-paved pedestrian corridor, and Bank Street catch basins east of Church Street. The existing paver pattern here is a tri-tone, repeating linear pattern that matches the bricks paving the center of Church Street. The brick pavers at this intersection are currently severely damaged as depicted in Figure 2. Additionally, there is a slight heave spot around a utility manhole at the northwest corner of the intersection. This corridor also lacks ADA tactile warning surface pavers. Sheet C-2B of Appendix D illustrates Dubois & King's proposed improvements to this high-priority location, which are listed below. **(Budgetary estimate for this intersection upgrade is \$220,000)**



Figure 2: Paver Damage at Bank & Church Streets

- Full width granite detectable warning strips similar to those at Church and Cherry Streets intersection. Details found in Appendix E.
- Granite bordered crosswalks at each vehicular approach
- Extension of granite meridian line through intersection
- General alternating paver pattern similar to alternatives

Existing Bank Street granite speed rumble control strips on both Bank Street vehicular approaches are also to be removed and paved over. It was noted during project meetings that these fall outside of the Marketplace's domain.



Figure 3: Paver Damage at College & Church Streets

Church Street & College Street Intersection

An existing conditions plan for the Church and College streets intersection can be found on Sheet 2 of Appendix C. This intersection is similar to Church and Bank Streets; featuring the same granite curb bump-outs as well as a roughly 65-foot wide brick-paved pedestrian corridor. The current paver pattern here is a tri-tone, diamond-shaped pattern matching that of the Church and Cherry Streets intersection. There are existing catch basins on College Street just east of the intersection. Crosswalk paver damage here is moderate but there are accompanying drainage problem spots, as Figure 3 shows. There is also a low spot on the northern edge of College Street east of the intersection. Sheet C-2A of Appendix D shows the proposed improvements to the Church and College streets

intersection, which incorporates the same elements as Church Street and Bank Street. **(Budgetary estimate for this intersection upgrade is \$195,000)**

Intersection Paving Alternatives

Two intersection paver layout alternatives were developed and are illustrated in Appendix D. Sheet C-1A shows option A, which is to match the existing dual-tone brick pattern which runs along the sides of the Marketplace and is called out on the same sheet. Option B, illustrated on Sheet C-2B, is to match the existing tri-tone diamond paver pattern found at the Church and College streets intersection as well as the Church and Cherry streets intersection.

Globe Pavers in front of City Hall

Many of the stone globe pavers in front of Burlington City Hall are loose and fragmented as Figure 4 illustrates, tarnishing the Marketplace aesthetics that attract visitors from around the world. This is likely due to improper installation and compaction especially for some utility maintenance work, reducing the lifespan of this feature. The Globe Stone Paver Detail on Sheet C-3 of Appendix D outlines the correct installation procedure for these pavers. Maintenance for this area will require careful review of paver type and layout to be provided by contractor. This typical detailing for paver installation should be a requirement for tenants and for utilities performing work within Church Street. Management of this may require the use of approved vendors. **(Budgetary estimate for repair of this area is \$65,000)**



Figure 4: Stone Globe Paver Damage

Subsurface Vaults

There are four subsurface vaults; the vault at 2 Church Street, 71 Church Street (currently Ken's Pizza & Pub), 131 Church Street (currently Von Bargaen's Jewelry) and 148 Church Street (currently The Scuffer Tap & Table).

To prevent the continued leakage of stormwater into the vault at 2 Church Street, which is currently being used for office space, it is recommended that a waterproof membrane be installed similar to that along the north side of the building. This would be a landowner responsibility and would require excavation of the pavers and subsurface above and adjacent to the vault. There are minimal options for the Marketplace to address this leakage beyond clearing snow away from this location.

The vaults at 71 Church Street (Ken's Pizza) and 131 Church Street (Von Bargaen's Jewelry) are to be permanently sealed shut. The vault hatchways, concrete walls and tops will be removed to below the frost line and pavers shall be replaced per the Typical Brick Paver Detail on Sheet C-3 of Appendix D. Vault access inside the buildings will also be bricked shut. The Von Bargaen's vault is currently empty and unused, but the Ken's Pizza vault houses electrical panels for the building as well as storage. A more in-depth analysis must be performed to explore options for relocating the electrical panels. **(Budgetary estimate for abandoning and filling these vaults is \$15,000 - \$25,000 excluding building and/or utility modifications)**

The door to The Scuffer vault at 148 Church Street was observed to be unlocked and ajar during the visual site evaluation. It should be locked when not in use to prevent inappropriate access and liability.

Incidental Repairs

Tree & Tree Pit Removal

The two dying trees called out on Sheets C-1 and C-2 of Appendix A are to be removed. There are also three tree pits to be removed and bricked over per the Typical Brick Paver Detail on Sheet C-3 of Appendix D. They are located at the northwest and southeast corners of the Bank and Church streets intersection (maintenance items #19 and #21 respectively) as well as in front of 107 Church Street (currently the Optical Center, maintenance item #28), shown on Sheets C-2 and C-3 of Appendix A. These tree pits are no longer in use; their trees have been previously removed and stumps cut down flush with grade.

Storefront Canopy Post Removal

Storefront canopies like the one pictured in Figure 5 are a prevalent feature of the shops at Church Street Marketplace. Originally designed to be easily modified into second story walkways, that vision was never realized. Now many members of the Marketplace are interested in their removal. Some previously removed canopies and associated foundations were not properly removed, leaving frost /hard spot humps in the replaced pavers. Dubois & King has provided a Typical Canopy Post Removal Detail on Sheet C-3 of Appendix D that outlines the proper method for canopy post removal.



Deferred Maintenance

Thirty-four isolated minor maintenance locations were recorded during this study that should be kept in mind moving forward. Instead of trying to spot-fix these issues, which would likely require a much larger area of re-paving than the lone issue warrants, they should be absorbed into future projects taking place in the same area. Deferred maintenance types are described as follows:

- Grading refers to low spots with the potential for stormwater puddling.
- Utilities encompass various gate valves, catch basins and manholes not sitting flush with the surrounding grade.
- Damaged pavers are missing or cracked pavers as well as settling/heaving spots.
- Vault deferred maintenance refers to concrete edge damage as well as concrete not at grade presenting a tripping hazard.

Table 1 below describes the general breakdown of deferred maintenance types. For a more in-depth description refer to the Required Maintenance Table in Appendix B.

Table 1: Deferred Maintenance Types

Type	Repair Estimate Per Location		Number of Locations	Total Repair Estimate	
	Low	High		Low	High
Grading	\$12,500	\$25,000	10	\$125,000	\$250,000
Utilities	\$1,500	\$4,000	7	\$10,500	\$28,000
Damaged Pavers	\$1,000	\$3,000	14	\$14,000	\$42,000
Vaults	\$15,000	\$25,000	3	\$45,000	\$75,000
TOTAL			34	\$194,500	\$395,000

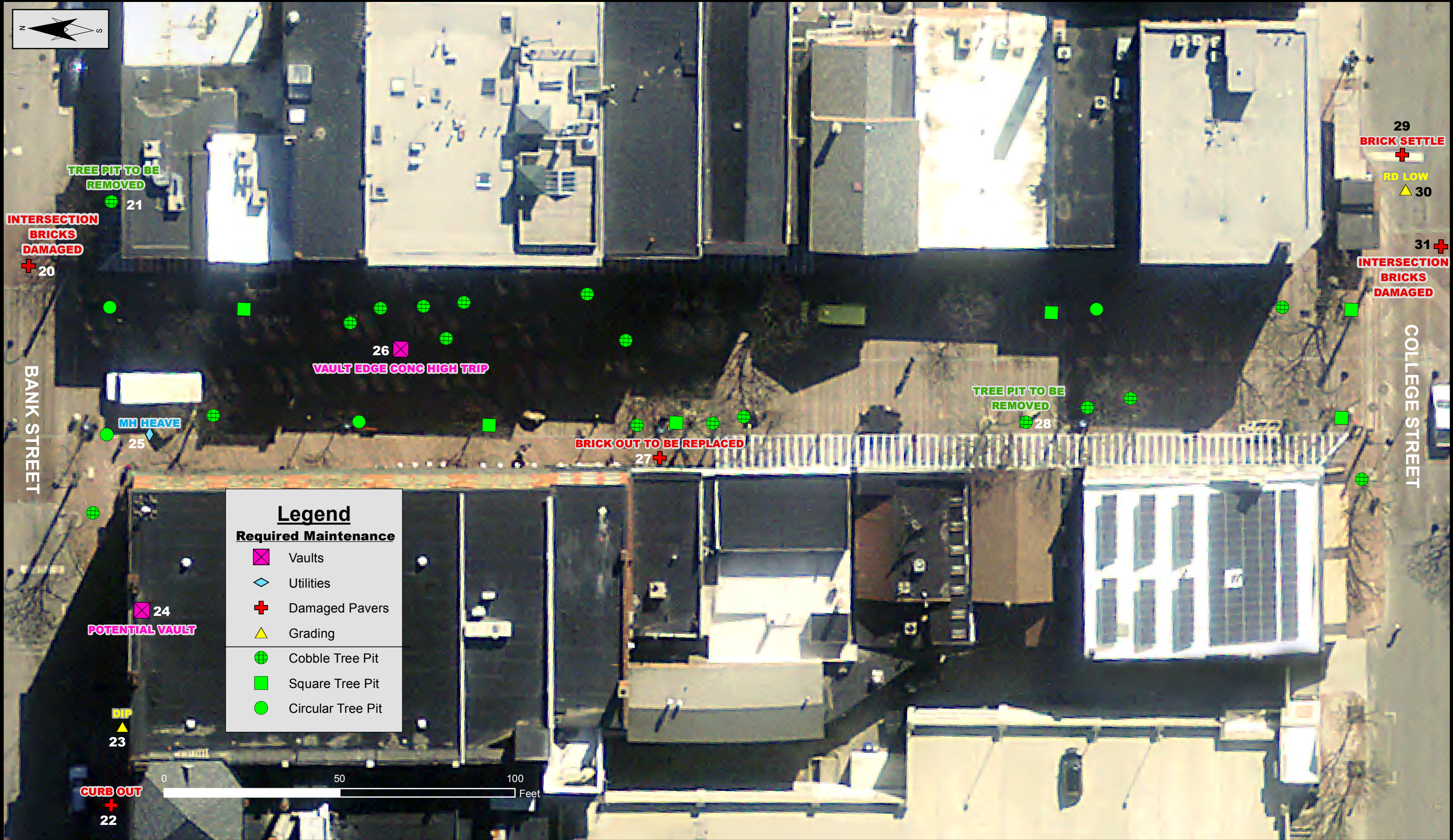
Design References

The following are resources that provide more information on current practices and specifications for the preceding design options.

Guidelines for Pedestrian Crossing Treatments. Vermont Agency of Transportation (January 2015 Update)
<http://vtrans.vermont.gov/sites/aot/files/highway/documents/ltf/Crossing%20Treatment%20Guidelines%20January%202015.pdf>










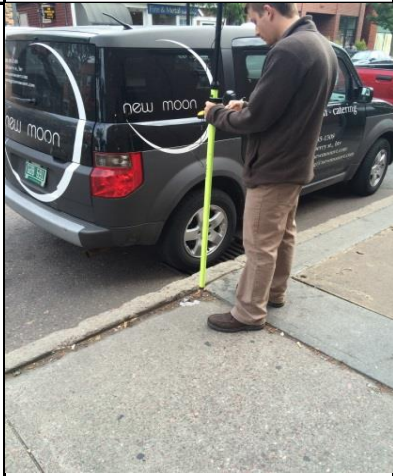





APPENDIX B

		CHURCH STREET MARKETPLACE	Visual Site Evaluation
			Updated Date: 1/30/2017
REQUIRED MAINTENANCE			
Item #	Category	Description	Image
1	Grading	Puddle	
2	Utilities	GV low	
3	Vaults	Stormwater leaking into vault (office space)	
4	Utilities	Catch basin lip low (looks typ for this model CB)	
5	Utilities	Catch basin lip low (looks typ for this model CB)	
6	Damaged Pavers	Brick Heave at dripline (vault below)	
7	Grading	Puddle	

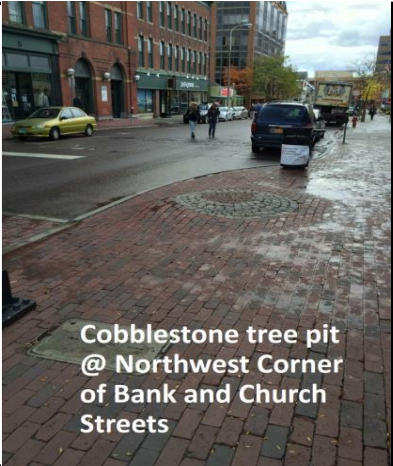

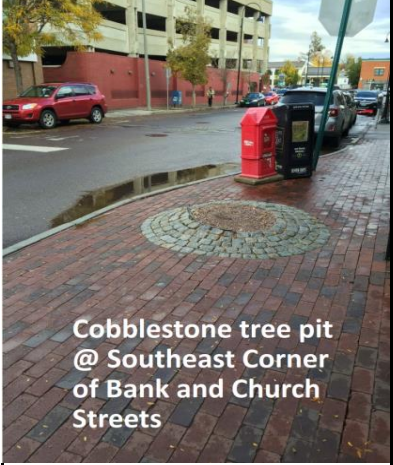
APPENDIX B

8	Grading	Puddle	
9	Grading	Puddle	
10	Grading	Puddle	
11	Vaults	Concrete edge of vault severely cracked	
12	Grading	Puddle	
13	Damaged Pavers	Curb lip dips	


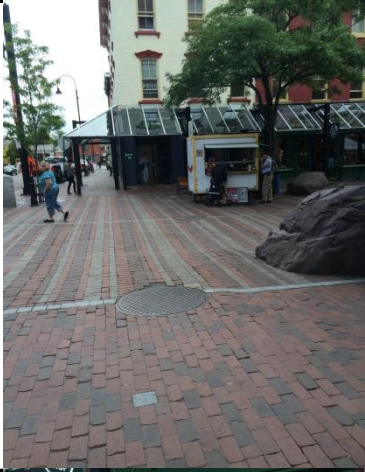

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14	Damaged Pavers	bump in brick pavers at international city 'Irkutsk' granite paver	
15	Damaged Pavers	Wave in bricks in front of Panera	
16	Grading	Puddle	
17	Damaged Pavers	Brick missing in front of Ken's Pizza above vault	
18	Damaged Pavers	International city 'Barranquilla' granite paver edge severely cracked	





APPENDIX B

19	Tree Pit Removal	Cobblestone tree pit at northwest corner of Bank & Church Streets to be removed and paved over	 A photograph showing a cobblestone tree pit at the northwest corner of Bank and Church Streets. The pit is a circular area of cobblestones in the middle of a brick-paved sidewalk. In the background, there are brick buildings, a yellow car, and a dark car on the street.
20	Damaged Pavers	Bank Street intersection crosswalk bricks damaged	 A photograph showing the intersection of Bank Street and Church Street. The crosswalk area is paved with red bricks, some of which appear damaged or missing. A white pickup truck is parked on the street, and a yellow diamond-shaped construction sign is visible.
21	Tree Pit Removal	Cobblestone tree pit at southeast corner of Bank & Church Streets to be removed and paved over	 A photograph showing a cobblestone tree pit at the southeast corner of Bank and Church Streets. The pit is a circular area of cobblestones in the middle of a brick-paved sidewalk. In the background, there are brick buildings, a red car, and a black car on the street.
22	Damaged Pavers	Curb missing	
23	Grading	Dip in sidewalk bricks	


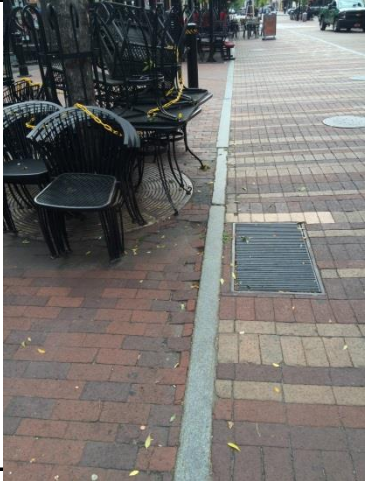

APPENDIX B

24	Vaults	Potential vault	
25	Utilities	Manhole heave	
26	Vaults	Concrete edge of vault high - trip hazard	
27	Damaged Pavers	Brick missing to be replaced	



APPENDIX B

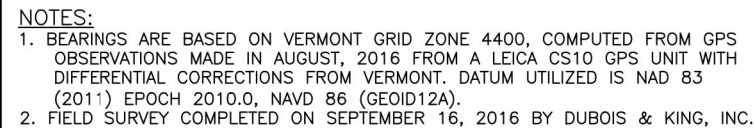
28	Tree Pit Removal	Cobblestone tree pit at 107 Church St (Optical Center) to be removed and paved over	 <p>Cobblestone tree pit @ Optical Center, 107 Church</p> <p>Google</p>
29	Damaged Pavers	Brick settle under bus stop roof	
30	Grading	Low spot in road	
31	Damaged Pavers	College Street intersection crosswalk bricks damaged	

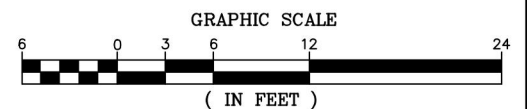
APPENDIX B

32	Utilities	Manhole low	
33	Damaged Pavers	Granite paver divider high - trip hazard	
34	Utilities	Electric Manhole rim high - trip hazard	
35	Vaults	Vault & concrete edge in rough shape	
36	Utilities	GV low	
37	Damaged Pavers	Trip hazard	
38	Damaged Pavers	Concrete pad high - trip hazard	
39	Damaged Pavers	Tree paver low	
40	Damaged Pavers	Globe paver broken	

APPENDIX B

41	Utilities	WV in globe pavers	
42	Vaults	Vault	
43	Damaged Pavers	Paver missing	
44	Grading	Low spot	
45	Utilities	Bell Manhole cast high	





1. BEARINGS ARE BASED ON VERMONT GRID ZONE 4400, COMPUTED FROM GPS OBSERVATIONS MADE IN AUGUST, 2016 FROM A LEICA CS10 GPS UNIT WITH DIFFERENTIAL CORRECTIONS FROM VERMONT. DATUM UTILIZED IS NAD 83 (2011) EPOCH 2010.0, NAVD 86 (GEOID12A).
2. FIELD SURVEY COMPLETED ON SEPTEMBER 16, 2016 BY DUBOIS & KING, INC.



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CHURCH STREET
MARKET PLACE

PROFESSIONAL SEAL

**NOT FOR
CONSTRUCTION
PRELIMINARY
PLANS**

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CHURCH STREET
MARKETPLACE

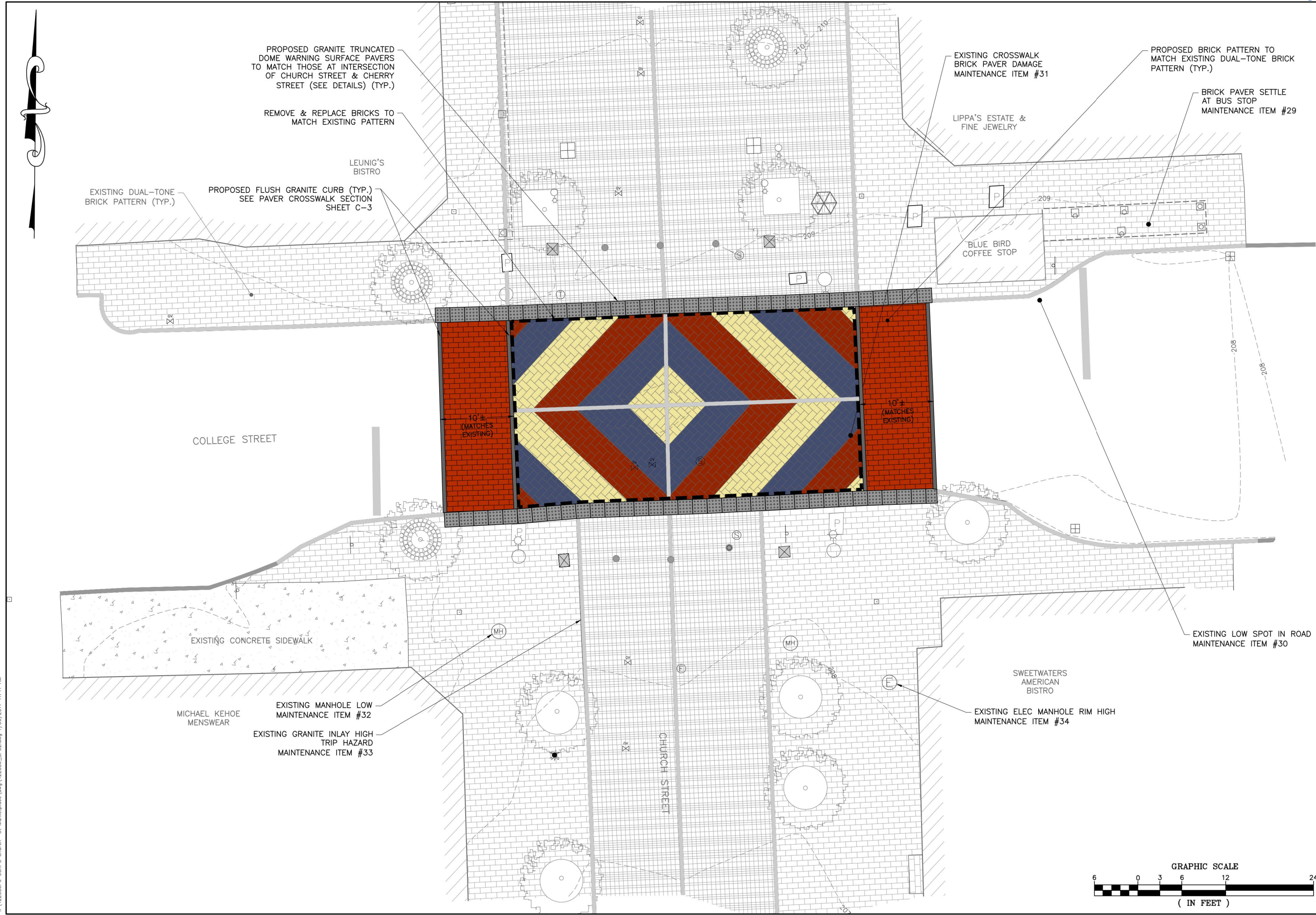
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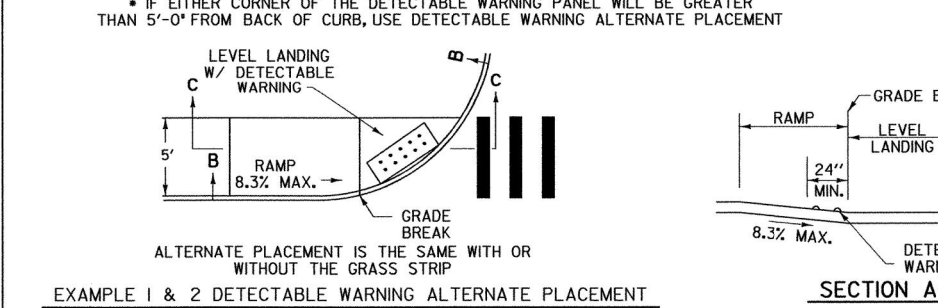
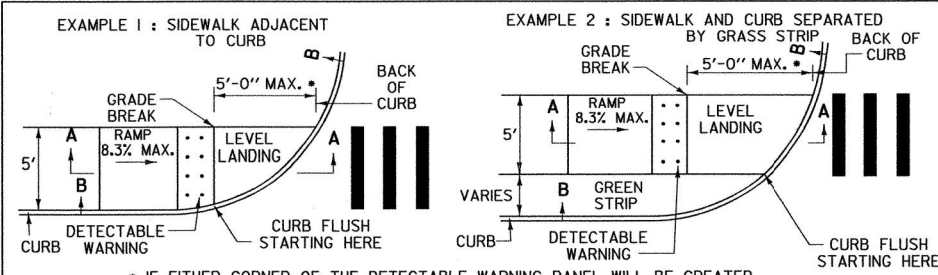
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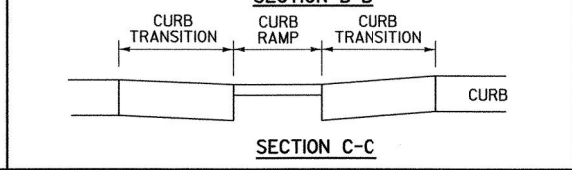
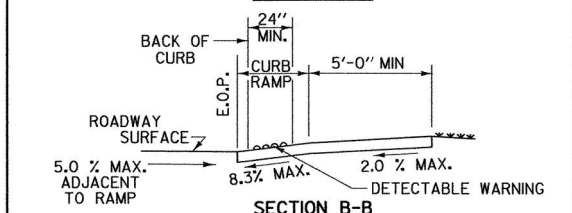
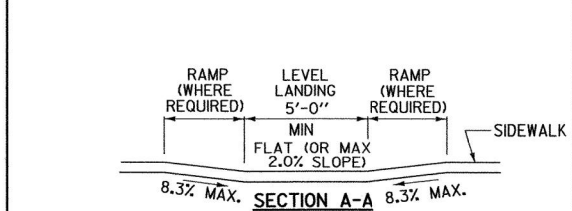
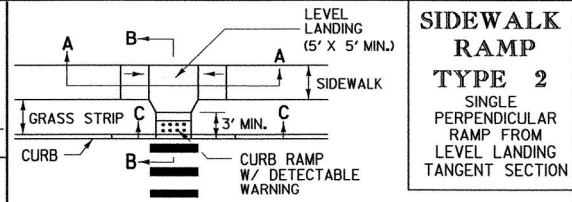
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C-2B

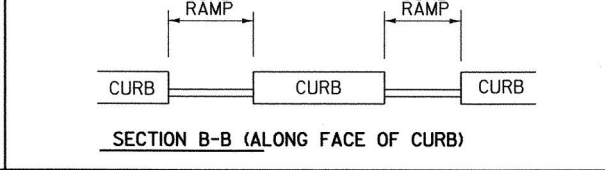
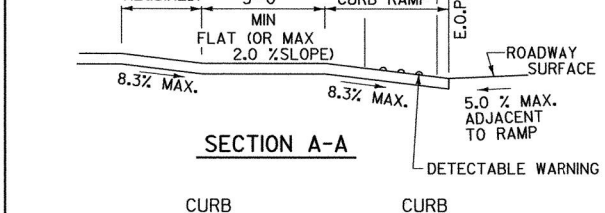
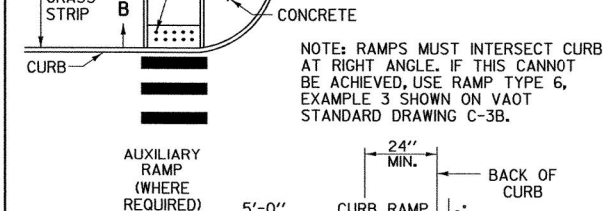
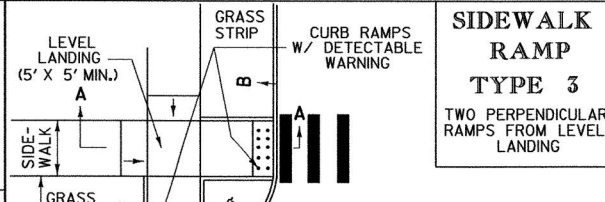




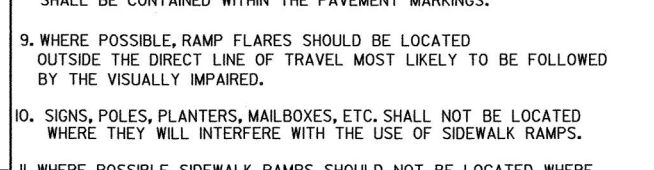
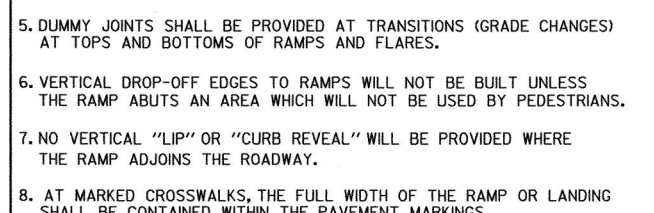
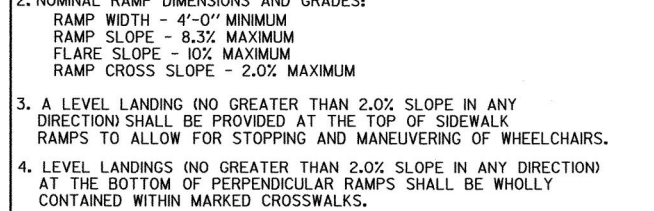
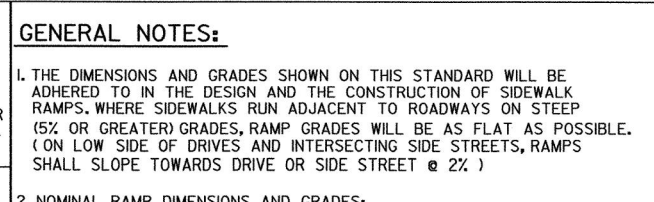
SIDEWALK RAMP TYPE 1
SINGLE WALK-STRAIGHT APPROACH TO PARALLEL RAMP.



SIDEWALK RAMP TYPE 2
SINGLE PERPENDICULAR RAMP FROM LEVEL LANDING TANGENT SECTION

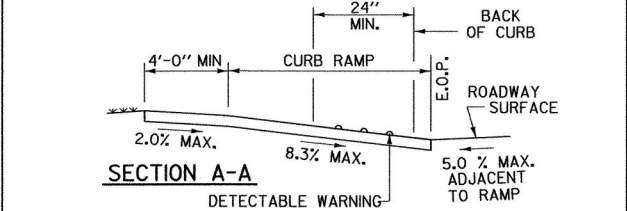
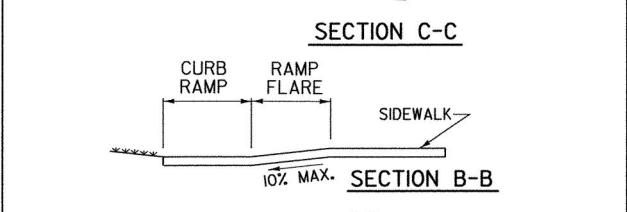
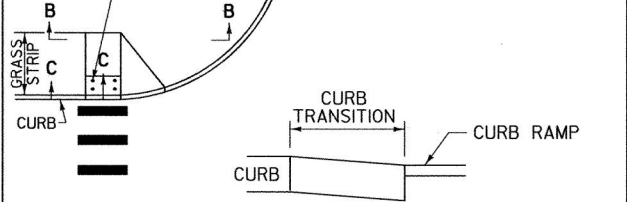


SIDEWALK RAMP TYPE 3
TWO PERPENDICULAR RAMP FROM LEVEL LANDING

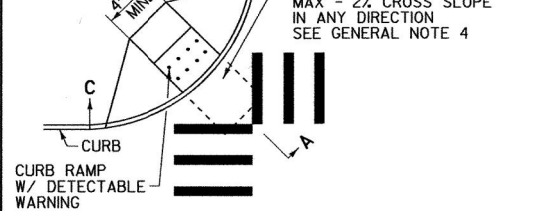
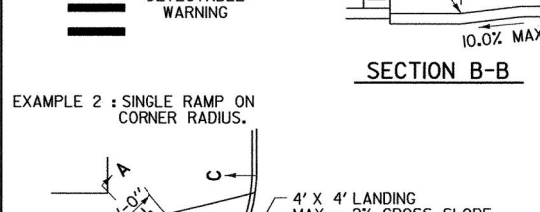
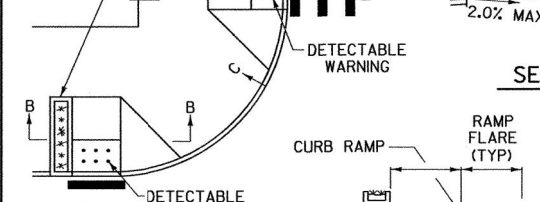


- GENERAL NOTES:**
1. THE DIMENSIONS AND GRADES SHOWN ON THIS STANDARD WILL BE ADHERED TO IN THE DESIGN AND THE CONSTRUCTION OF SIDEWALK RAMP. WHERE SIDEWALKS RUN ADJACENT TO ROADWAYS ON STEEP (5% OR GREATER) GRADES, RAMP GRADES WILL BE AS FLAT AS POSSIBLE. (ON LOW SIDE OF DRIVES AND INTERSECTING SIDE STREETS, RAMP SHALL SLOPE TOWARDS DRIVE OR SIDE STREET @ 2%)
 2. NOMINAL RAMP DIMENSIONS AND GRADES:
RAMP WIDTH - 4'-0" MINIMUM
RAMP SLOPE - 8.3% MAXIMUM
FLARE SLOPE - 10% MAXIMUM
RAMP CROSS SLOPE - 2.0% MAXIMUM
 3. A LEVEL LANDING (NO GREATER THAN 2.0% SLOPE IN ANY DIRECTION) SHALL BE PROVIDED AT THE TOP OF SIDEWALK RAMP. RAMP SHALL BE PROVIDED FOR STOPPING AND MANEUVERING OF WHEELCHAIRS.
 4. LEVEL LANDINGS (NO GREATER THAN 2.0% SLOPE IN ANY DIRECTION) AT THE BOTTOM OF PERPENDICULAR RAMP SHALL BE WHOLLY CONTAINED WITHIN MARKED CROSSWALKS.
 5. DUMMY JOINTS SHALL BE PROVIDED AT TRANSITIONS (GRADE CHANGES) AT TOPS AND BOTTOMS OF RAMP AND FLARES.
 6. VERTICAL DROP-OFF EDGES TO RAMP WILL NOT BE BUILT UNLESS THE RAMP ADJUTS AN AREA WHICH WILL NOT BE USED BY PEDESTRIANS.
 7. NO VERTICAL "LIP" OR "CURB REVEAL" WILL BE PROVIDED WHERE THE RAMP ADJOINS THE ROADWAY.
 8. AT MARKED CROSSWALKS, THE FULL WIDTH OF THE RAMP OR LANDING SHALL BE CONTAINED WITHIN THE PAVEMENT MARKINGS.
 9. WHERE POSSIBLE, RAMP FLARES SHOULD BE LOCATED OUTSIDE THE DIRECT LINE OF TRAVEL MOST LIKELY TO BE FOLLOWED BY THE VISUALLY IMPAIRED.
 10. SIGNS, POLES, PLANTERS, MAILBOXES, ETC. SHALL NOT BE LOCATED WHERE THEY WILL INTERFERE WITH THE USE OF SIDEWALK RAMP.
 11. WHERE POSSIBLE, SIDEWALK RAMP SHOULD NOT BE LOCATED WHERE USERS MUST CROSS DROP INLET GRATES, MANHOLE COVERS OR OTHER ACCESS LIDS. IF THIS CANNOT BE AVOIDED THEN GRATE DESIGN AND PLACEMENT SHALL CONFORM TO ADA REQUIREMENTS.
 12. CURB DRAINAGE SHOULD BE CONSTRUCTED SO AS TO PRECLUDE THE FLOW OF WATER PAST THE SIDEWALK RAMP.
 13. WHEREVER FEASIBLE, TWO SIDEWALK RAMP ARE RECOMMENDED IN PREFERENCE TO A SINGLE RAMP.
 14. JOINTS WILL BE CONSTRUCTED IN ACCORDANCE WITH CURRENT SIDEWALK SPECIFICATIONS, HOWEVER EXPANSION JOINTS WITHIN THE SIDEWALK RAMP AREA WILL BE AVOIDED WHEREVER POSSIBLE.
 15. SIDEWALKS THAT ARE LESS THAN 5' WIDE REQUIRE 5' WIDE BY 5' LONG PASSING AREAS (NO GREATER THAN 2.0% CROSS SLOPE) AT INTERVALS NOT TO EXCEED 200 FEET.
 16. E.O.P. = EDGE OF PAVEMENT
 17. THE PUBLIC SIDEWALK CURB RAMP STANDARDS DEPICTED HERE MAY NOT BE APPROPRIATE FOR ALL LOCATIONS. FIELD CONDITIONS AT INDIVIDUAL LOCATIONS MAY REQUIRE SPECIFIC DESIGNS. DESIGNS MUST BE CONSISTENT WITH THE PROVISIONS OF THIS SHEET TO THE MAXIMUM EXTENT FEASIBLE ON ALTERATION PROJECTS AND WHEN STRUCTURALLY PRACTICABLE ON NEW CONSTRUCTION PROJECTS AS REQUIRED BY THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES.

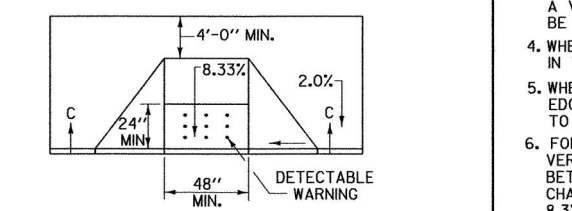
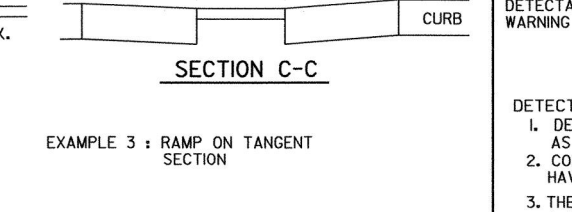
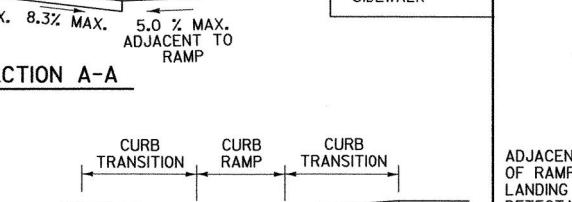
SIDEWALK RAMP TYPE 4
RAMP OFFSET FROM DIRECT LINE OF PEDESTRIAN TRAVEL



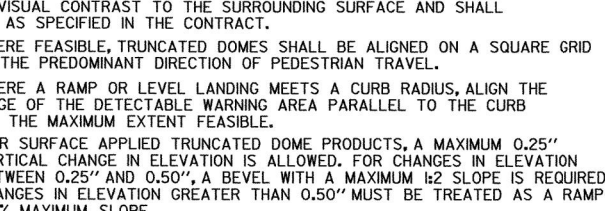
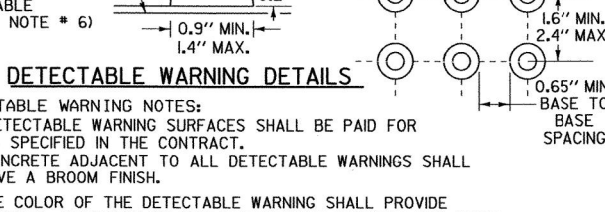
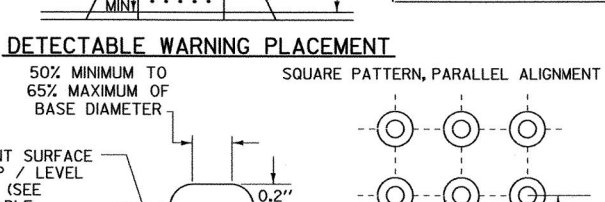
SIDEWALK RAMP TYPE 5
PERPENDICULAR RAMP IN URBAN SETTING - WIDE SIDEWALK



SIDEWALK RAMP TYPE 6
PERPENDICULAR RAMP IN URBAN SETTING - WIDE SIDEWALK



DETECTABLE WARNING DETAILS



REVISIONS AND CORRECTIONS

FEB. 2, 2004 - DATE OF ORIGINAL ISSUE

SEPT. 1, 2004 - MINOR REVISIONS TO COMPLY WITH ADAAG

MAR. 10, 2008 - MINOR REVISIONS TO COMPLY WITH ADA STANDARDS

APPROVED

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SIDEWALK RAMPS



STANDARD

C-3A